

FIG. 1

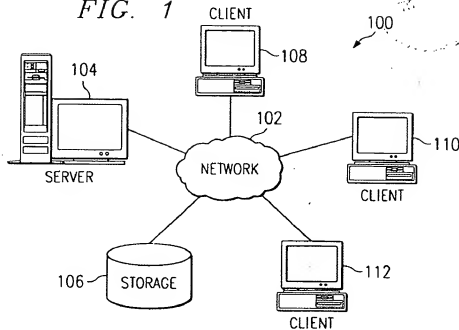
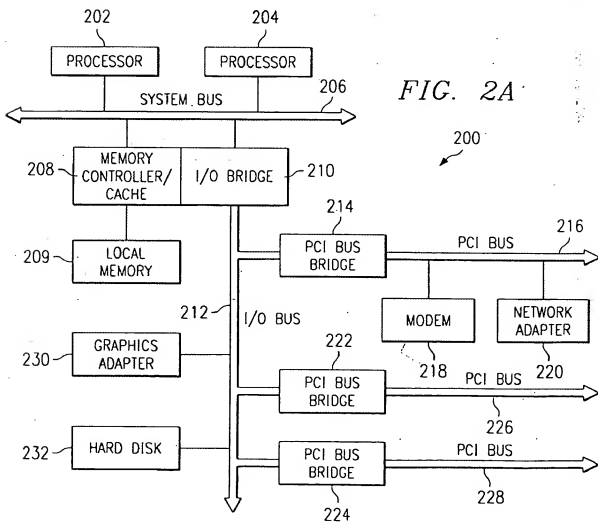


FIG. 2A



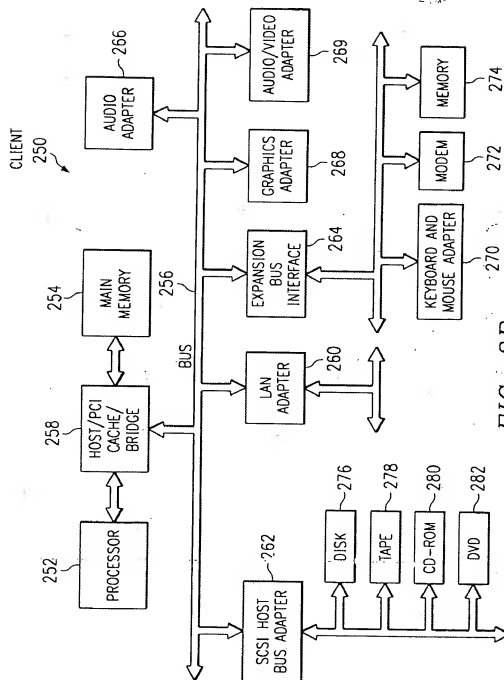
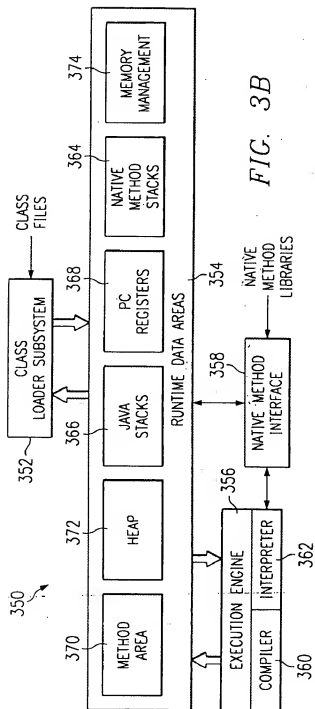
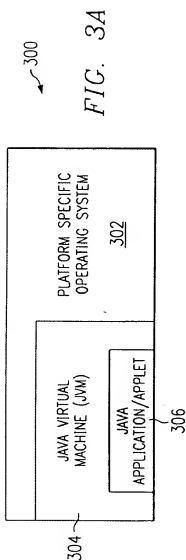


FIG. 2B



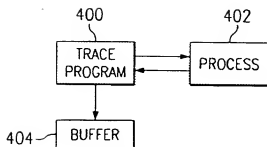


FIG. 4

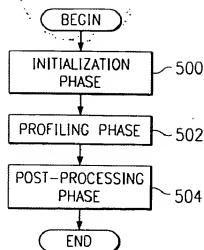


FIG. 5

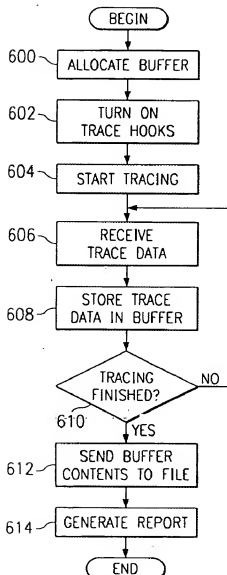


FIG. 6

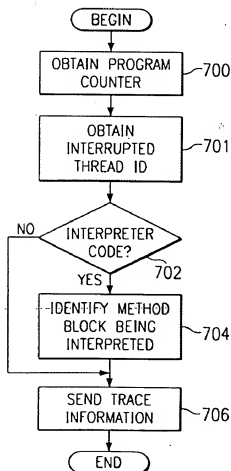


FIG. 7

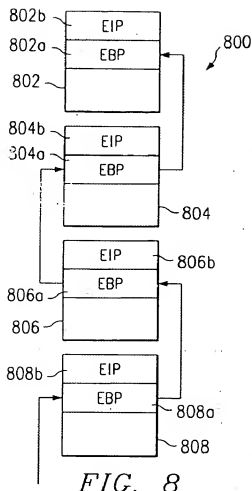


FIG. 8

SAMPLE	CALL STACK @ SAMPLE
1	C
2	CAB
3	CAB
4	CAB
5	C
6	CBA
7	CBABA
8	CBA
9	CBA
10	C

FIG. 10B

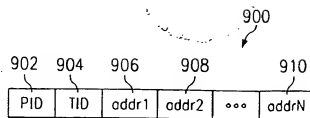


FIG. 9

TIMESTAMP	EVENT	CALL STACK AFTER EVENT
0	ENTER C	
1	ENTER A	C
2	ENTER B	CA
3	EXIT FROM B	CAB
4	ENTER B	CA
5	ENTER B	CAB
6	EXIT FROM B	CABB
7	EXIT FROM B	CAB
8	EXIT FROM A	CA
9	ENTER B	C
10	ENTER A	CB
11	ENTER B	CBA
12	ENTER A	CBAB
13	EXIT FROM A	CBABA
14	EXIT FROM B	CBA
15	ENTER X	CBAX
16	EXIT FROM X	CBA
17	EXIT FROM A	CB
18	EXIT FROM B	C
19	EXIT FROM C	

FIG. 10A

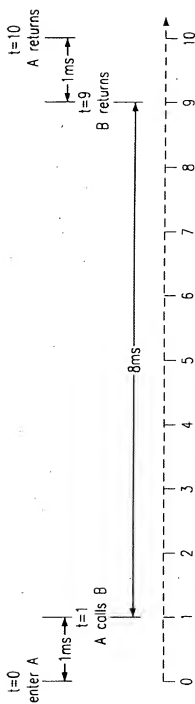


FIG. 10C

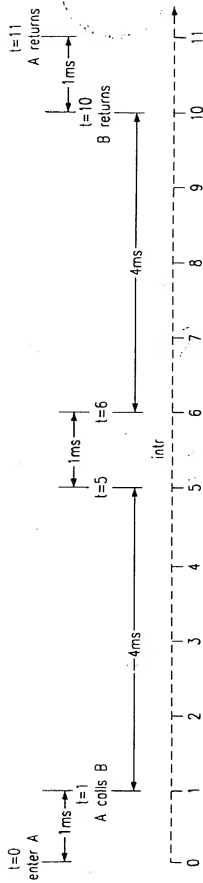


FIG. 10D

FIG. 11A

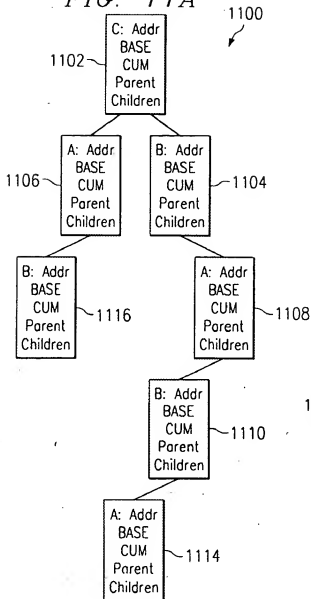


FIG. 11B

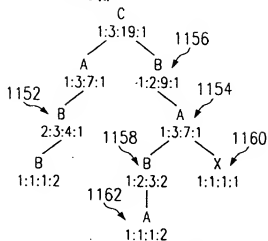


FIG. 12

LEVEL	RL	CALLS	BASE	CUM	INDENT
0	1	1	0	19	pL_pidid
1	1	1	3	19	-C
2	1	1	3	7	--A
3	1	2	3	4	---B
4	2	1	1	1	----B
2	1	1	2	9	--B
3	1	1	3	7	---A
4	2	1	2	3	----B
5	2	1	1	1	-----A
4	1	1	1	1	----X

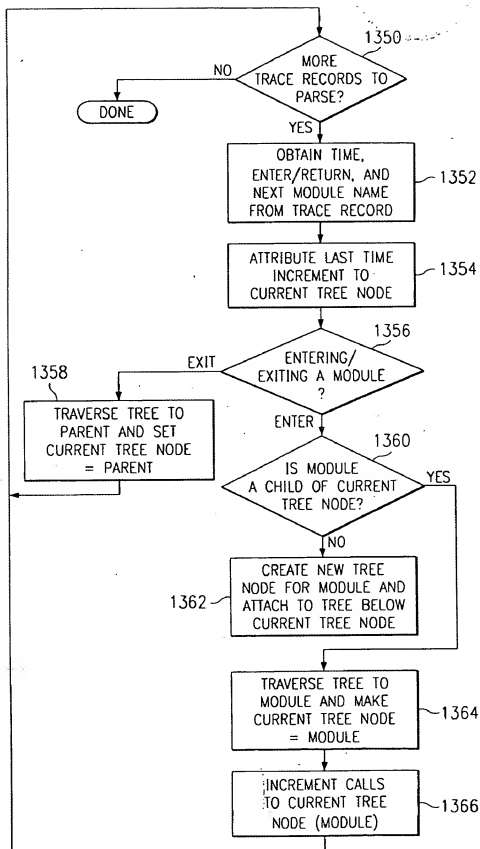
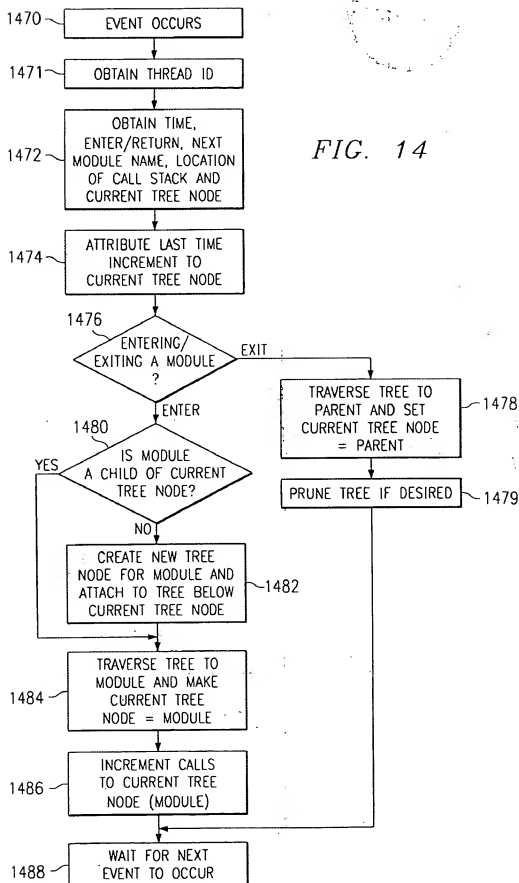


FIG. 13



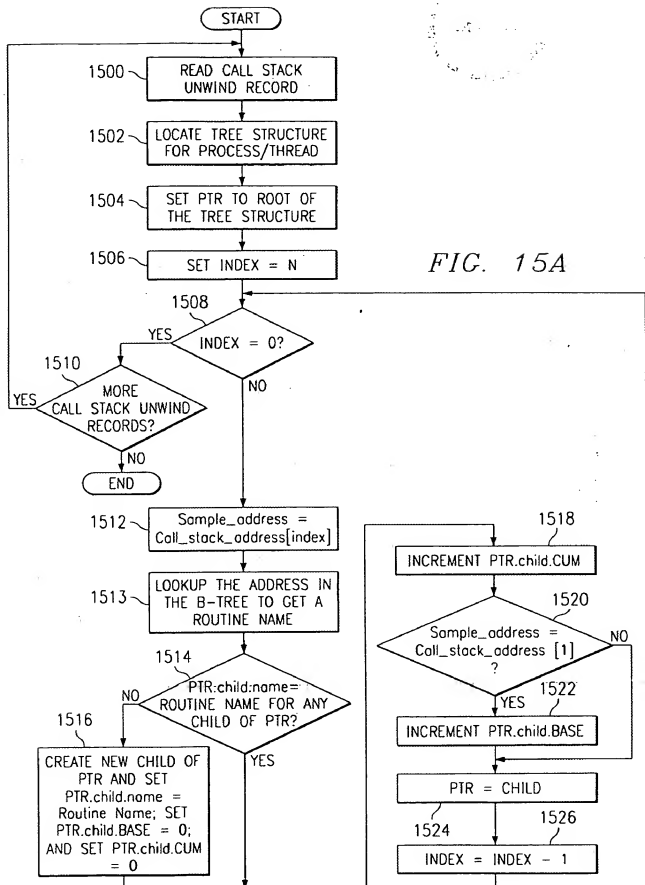


FIG. 15B

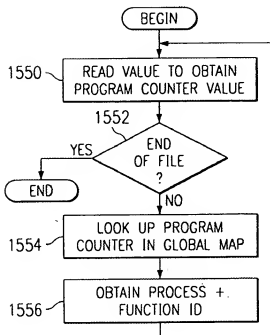
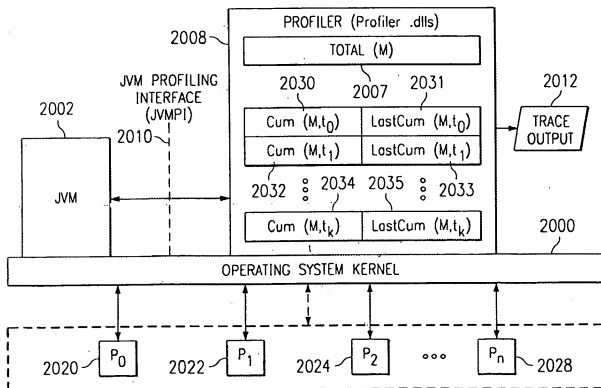


FIG. 16

1600

1602	1604	1606	1608
CALLS	BASE	CUM	NAME
1	0	19	pt_pit.tid
1	3	19	C
3	7	14	A
5	8	13	B
1	1	1	X

FIG. 20



1700

ArcFlow Output

Base - Time/Instructions directly in function

Cum - Time/Instructions directly & indirectly in function

ArcFlow Invariants:

- 1) $\text{Sum}(\text{Parent}(\text{Calls})) = \text{Self}(\text{Calls})$
- 2) $\text{Sum}(\text{Parent}(\text{Base})) = \text{Self}(\text{Base})$
- 3) $\text{Sum}(\text{Parent}(\text{Cum})) = \text{Self}(\text{Cum})$
- 4) $\text{Sum}(\text{Child}(\text{Cum})) = \text{Self}(\text{Cum}) - \text{Self}(\text{Base})$

Source	Calls	Base	Cum	Function
Self	1	0	19	[0] pt_pidtid
Child	1	3	19	C
Parent	1	3	19	pL_pidtid
Self	1	3	19	[1] C
Child	1	2	9	B
Child	1	3	7	A
Parent	1	3	7	C
Parent	1	3	7	B
rParent	1	1	1	B
Self	3	7	17	[2] A
			15	
Child	3	5	7	B
Child	1	1	1	X
Parent	2	3	4	A
rParent	1	2	3	A
Parent	1	2	9	C
Self	5	8	13	[3] B
			17	
Child	1	3	7	A
rChild	1	1	1	A
Child	1	1	1	B
Parent	1	1	1	A
Self	1	1	1	[4] X

FIG. 17

Units : : Ticks
Total : : 342

1800

Lvl	RL	Calls	Bose	Cum	Indent	Name
1	1	1	0	342	-	Thread-21_(0xe0046618)
2	1	3	0	342	--	J:nulltestScore()I
3	1	2	0	272	---	J:nulltestMilliseconds()I
4	1	29450	0	271	----	J:nullexecute()I
5	1	271	0	271	-----	stack_0x40
6	1	271	0	271	-----	+ F:ExecuteJava ← 1802
7	1	271	0	271	-----	+ F:jit_invokeCompiledEntryMethod
8	1	271	0	271	-----	+ F:_jit_invokeentry
9	1	271	0	271	-----	+ F:JITInvokeCompiledEntryMethod_md
10	1	271	0	271	-----	+ J:nullrun()V
11	2	271	0	271	-----	+ J:nulltestScore()I
12	2	271	0	271	-----	+ J:nulltestMilliseconds()I
13	2	271	268	271	-----	+ J:nullexecute()I
14	1	2	0	2	-----	+ F:jperf_methodEntry
15	1	2	0	2	-----	+ F:SoftTracehook
16	1	2	2	2	-----	+ F:enable_interrupts
14	1	1	1	1	-----	+ F:jperf_methodExit
4	1	1	0	1	-----	stack_0x40
5	1	1	0	1	-----	+ F:ExecuteJava ← 1804
6	1	1	0	1	-----	+ F:jit_invokeCompiledEntryMethod
7	1	1	0	1	-----	+ F:_jit_invokeentry
8	1	1	0	1	-----	+ F:JITInvokeCompiledEntryMethod_md
9	1	1	0	1	-----	+ J:nullrun()V
10	2	1	0	1	-----	+ J:nulltestScore()I
11	2	1	0	1	-----	+ J:nulltestMilliseconds()I
12	1	1	0	1	-----	+ J:nullexecute()I
13	1	1	0	1	-----	+ F:jperf_methodExit
14	1	1	0	1	-----	+ F:SoftTracehook
15	1	1	1	1	-----	+ F:enable_interrupts
4	1	2	0	0	-----	J:nullcleanUp()I

1806

1808

FIG. 18

FIG. 19

MAJOR CODE	MINOR CODE	DATA ITEM 1	DATA ITEM 2	DATA ITEM 3	DATA ITEM 4	DATA ITEM 5	DESCRIPTION
0x4	LEVEL + 0x1	DEPTH	N/A	N/A	N/A		BEGIN INTERRUPT AT LEVEL
0x4	LEVEL + 0x80000001	DEPTH	N/A	N/A	N/A		END INTERRUPT AT LEVEL
0x10	0x0b	SYSTEM TID	JAVA TID	IS SYSTEM THREAD (BOOLEAN)	N/A		THREAD CREATED WITHOUT A NAME WHILE TRACE ACTIVE
0x10	0xac	SYSTEM TID	N/A	N/A	N/A		IDENTIFIES THE IDLE THREAD
0x10	0xad	SYSTEM TID	N/A	N/A	N/A		IDENTIFIES THE GARBAGE COLLECTION THREAD
0x10	0xae	SYSTEM TID	JAVA TID	THREAD NAME	N/A		THREAD CREATED WITH A NAME WHILE TRACE ACTIVE
0x30	0x10	OBJECT ID	METHOD BLOCK ADDRESS	N/A	N/A		METHOD INVOCATION (INTERPRETED)
0x30	0x10 + 0x80000000	OBJECT ID	METHOD BLOCK ADDRESS	N/A	N/A		METHOD EXIT (INTERPRETED)
0x40	0x7fffffff	NUMBER (n) OF STACK UNWINDS AT TIMER INTERRUPT	pc1-PROGRAM COUNTER OF INTERRUPTED ROUTINE	pc2-CALLER OF INTERRUPTED ROUTINE	pcn-1 OF n-2nd CALLER OF INTERRUPTED ROUTINE	pcn OF n-1st CALLER OF INTERRUPTED ROUTINE
0x41	0x7fffffff	NUMBER (n) OF STACK UNWINDS AT INSTRUMENTED ROUTINE	pc1-PROGRAM COUNTER OF INSTRUMENTED ROUTINE	pc2-CALLER OF INSTRUMENTED ROUTINE		pcn OF n-1st CALLER OF INSTRUMENTED ROUTINE
0x50	0x10	OBJECT ID	METHOD BLOCK ADDRESS	N/A	N/A		METHOD INVOCATION (JITTED)
0x50	0x10 + 0x80000000	OBJECT ID	METHOD BLOCK ADDRESS	N/A	N/A		METHOD EXIT (JITTED)

FIG. 21A

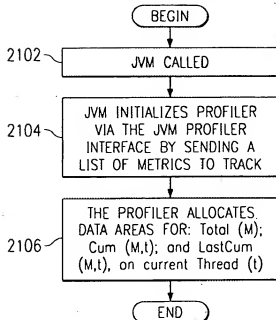


FIG. 21B

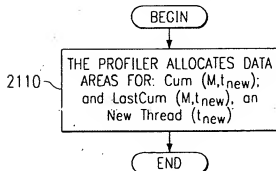


FIG. 22

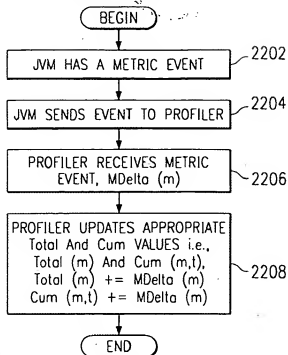


FIG. 23

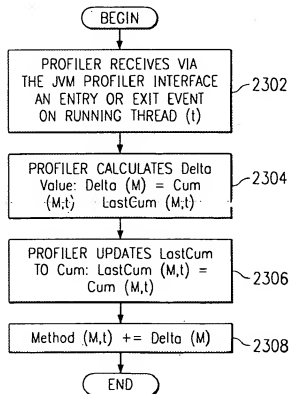


FIG. 24

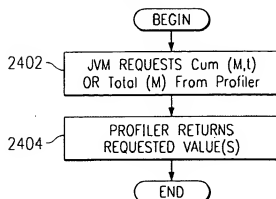


FIG. 25

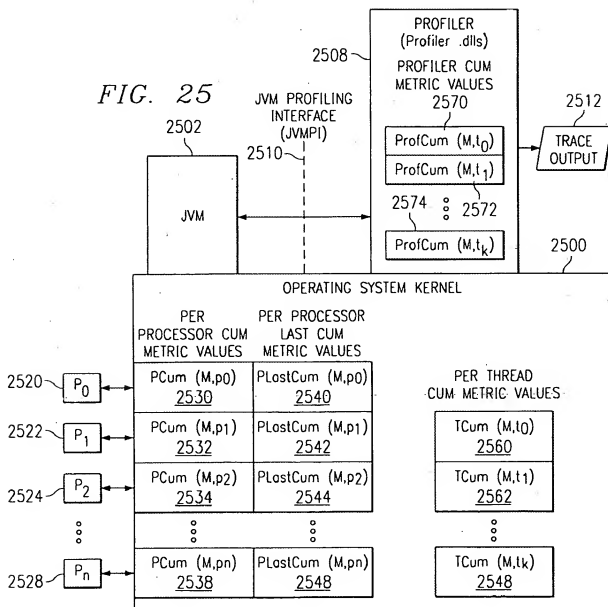


FIG. 26A

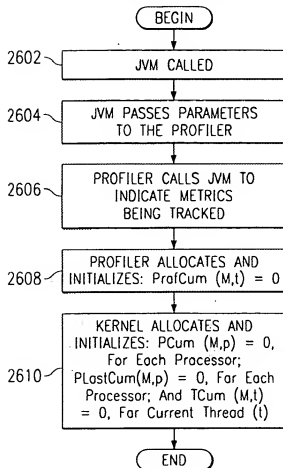


FIG. 26B

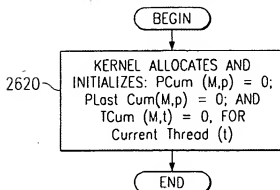


FIG. 26C

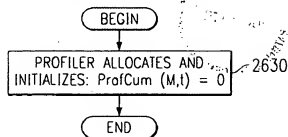


FIG. 27

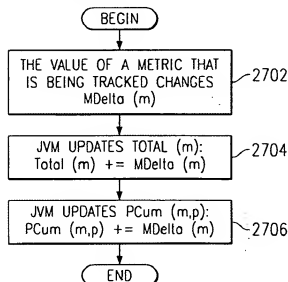


FIG. 28

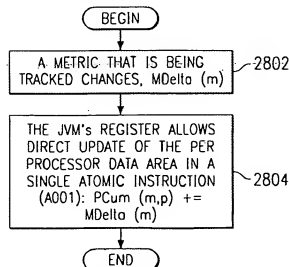


FIG. 29

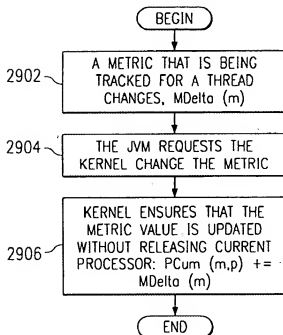


FIG. 30

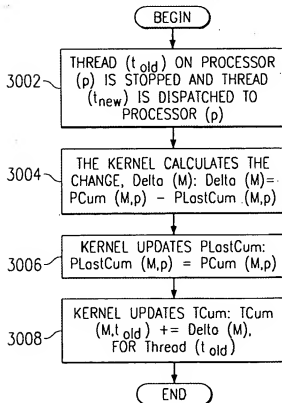


FIG. 31

